

CLAIMS:

1. A method of displaying visual content, said method comprising:
generating a plurality of different levels of detail (LODs) of the visual content;
displaying the visual content as an interpolation of said LODs while the visual content is navigated; and
displaying a final image including at least a portion not as an interpolation of said LODs when said navigation substantially ceases.
2. The method of claim 1 wherein said navigation comprises one of more of the following: two or three dimensional translation, rotation, image filtering, local stretching, dynamic spatial distortion, magnification or minification.
3. The method of claim 1 wherein prior to said final image being displayed, an intermediate final image is generated by interpolation from said plurality of said LODs.
4. The method of claim 3 wherein said intermediate final image gradually changes to said final image.
5. The method of claim 4 wherein said final image or said intermediate image is rendered on a tile-by-tile basis.
6. The method of claims 3, 4 or 5 wherein each LOD is comprised of tiles and said final image or said intermediate final image is displayed by using tiles from several LODs displayed as composite tiles.
7. The method of claim 6 wherein the tiles of each LOD are made available for entry into a frame buffer in an order that depends at least in part upon the LOD in which the tile is, or whether the tile is viewable presently, or the degree of foveation of such tile.

8. The method of claim 7 wherein viewable tiles are rendered first, and within said viewable tiles, tiles are rendered in order of increasing resolution, and within tiles of a similar resolution, tiles are rendered in foveated order.
9. The method of claim 8 further comprising implementing irrational tiling.
10. The method of claim 6 wherein said visual content comprises vector and nonvector data.
11. The method of claim 10 wherein said plurality of LODs are generated at a remote terminal, and said intermediate and final images are generated at a locally viewable terminal.
12. A method of displaying visual content that is being navigated comprising displaying said visual content as an interpolation of plural LODs during said navigation and displaying said visual content at least in part not as an interpolation of plural LODs when said navigation is substantially over.
13. The method of claim 12 wherein displaying said visual content as an interpolation of plural LODs gradually fades to displaying said visual content not as an interpolation of plural LODs.
14. A method of representing visual content by generating a set of LODs, each LOD comprising tiles, a number of tiles in a first LOD and a number of tiles in a second LOD not forming a ratio of integers for at least one subset of first and second LODs in said set.
15. The method of claim 14 comprising rendering composite tiles as a combination of parts of tiles from various LODs stacked on top of one another.

16. The method of claim 16 further comprising rendering tiles from each of a plurality of LODs in an order sorted first by viewability, within said viewable tiles by LOD, and within each LOD by level of foveation.

17. A method of displaying visual content comprising combining plural LODs representing visual content, and gradually altering a contribution attributable to at least one of said LODs so that said displayed visual content gradually changes toward a better displayed image in response to information to render said better displayed image becoming available.

18. The method of claim 17 wherein said contribution is altered gradually by assigning at least one weight to plural tiles within plural LODs, and then altering said weights.

19. The method of claim 17 wherein said assigning assigns plural weights to each of said tiles in at least one LOD.

20. The method of claim 19 wherein said plural weights include opacities at each of plural corners of said tile, opacities at each of plural edges of said tile, and an opacity at a point within each of said tiles.

21. The method of claim 18 further comprising calculating a levelopacitygrid set of variables for plural locations in an LOD, said levelopacitygrid set of variables being calculated by utilizing at least some of the weights of claim 20 for all tiles in said LOD tangent to a vertex at which said levelopacitygrid is to be calculated.

22. The method of claim 21 further comprising spatially filtering said levelopacitygrid set of variables for at least one LOD.

23. The method of claim 17 wherein said combination is made such that combinations from higher resolution LODs near the resolution of the display are emphasized over lower resolution LODs when such higher resolution LODs are available.
24. A method of representing visual content comprising combining a first LOD with a second LOD, each of said LODs being comprised of plural tiles, the tiles being arranged so that edges of said tiles in said LODs do not align throughout substantially all the visual content.
25. The method of claim 16 applied to three or more such LODs having increasing resolution, wherein when the LODs are arranged in order of increasing resolution, no two consecutive LODs differ in resolution by a rational multiple.
26. A method of combining plural LODs to display visual content, the method comprising weighting each of the LODs with an associated contribution, and varying the contribution provided by each LOD over time and space.
27. The method of claim 26 wherein the weighting is an opacity level.
28. The method of claim 27 wherein the total opacity of the combined LODs is less than one hundred percent.
29. The method of claim 28 wherein said varying over time results in asymptotic convergence toward a target value.
30. The method of claim 29 wherein for each LOD, an opacity level is calculated for each of a plurality of vertices.
31. The method of claim 30 wherein said varying over time and space is designed to diminish viewable discontinuities.

32. The method of claim 31 wherein values representing the weighting are low pass filtered.
33. A method comprising displaying an intermediate final image and then displaying a final image, the final image and intermediate final image being comprised of tiles rendered in foveated order, a transition from intermediate final image to final image being displayed occurring upon detection of navigation substantially ceasing.
34. The method of claim 33 wherein lower resolution tiles are displayed prior to higher resolution tiles.
35. The method of claim 34 wherein said transition is gradual.
36. Apparatus for displaying a final image, after navigation substantially ceases, comprising means for displaying interpolated images while navigation occurs, means for detecting when navigation has substantially ceased, and rerendering vector data and non vector data using separate algorithms to display said final image.
37. The apparatus of claim 36 wherein said final image has tiles that contain both vector and non-vector data, and wherein at least one such tile is rendered using two different algorithms to accomplish this rendering.
38. The apparatus of claim 37 further comprising a processor to implement software to fade from an intermediate image to a final image.
39. A method of displaying visual content comprising combining plural LODs representing visual content, and gradually altering a contribution attributable to at least three of said LODs so that said displayed visual content gradually changes.

40. The method of claim 17 wherein said contribution is altered gradually by assigning at least one weight to plural tiles within plural LODs, and then altering said weights.

41. The method of claim 40 wherein said assigning assigns plural weights to each of said tiles in at least one LOD.

42. The method of claim 41 wherein said plural weights include opacities at each of plural corners of said tile, opacities at each of plural edges of said tile, and an opacity at a point within each of said tiles.

43. The method of claim 42 further comprising calculating a levelopacitygrid set of variables for plural locations in an LOD, said levelopacitygrid set of variables being calculated by utilizing at least some of the weights of claim 19 for all tiles in said LOD tangent to a vertex at which said levelopacitygrid is to be calculated.

44. The method of claim 43 further comprising spatially filtering said levelopacitygrid set of variables for at least one LOD.

45. The method of claim 17 wherein said combination is made such that combinations from higher resolution LODs are increased over contributions from lower resolution LODs.